

famethoxazole, cefuroxime, and cefixime (which has little activity against *S pneumoniae* and virtually none against *S aureus*).

Fungal (such as *Aspergillus fumigatus*) sinusitis is recognized increasingly in immunocompetent as well as immunocompromised patients. Invasive disease usually requires debridement and systemic antifungal drugs. Allergic fungal sinusitis is usually treated by debridement, systemic corticosteroids, and occasionally by systemic antifungal drugs.

Adjunctive treatment of sinusitis has not been evaluated by well-controlled studies. Many authorities favor nasal saline lavage and topical corticosteroid spray, such as beclomethasone dipropionate or flunisolide, in recurrent or chronic sinusitis, with the view that such low-risk therapy may aid sinus ventilation and mucociliary clearance by reducing nasal mucosal inflammation. Decongestants administered orally (pseudoephedrine hydrochloride, phenylpropanolamine hydrochloride) or topically (oxymetazoline hydrochloride, phenylephrine hydrochloride) may transiently lessen symptoms but also may inspissate secretions and reduce ciliary function, effects that may be counteracted by nasal saline lavage or mucoevacuants (such as guaifenesin). The anticholinergic properties of older-generation antihistamines likewise may dehydrate secretions and thus should be avoided in favor of newer-generation agents—that is, terfenadine, astemizole, and loratadine—but only when allergy is a suspected factor. Recently developed endoscopic sinus surgery for refractory chronic sinusitis may result in dramatic therapeutic success, largely because of its effectiveness in restoring natural drainage to the ostiomeatal complex with minimal disruption of sinus mucosa.

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Topical Nasal Steroids for Allergic Rhinitis

TOPICAL CORTICOSTEROIDS are currently the most potent medications available for the treatment of allergic rhinitis. Intranasal preparations eliminate the systemic side effects and equal or exceed the efficacy of their oral counterparts. The therapeutic effect produced is not completely understood but is thought to involve the inhibition of allergen-induced mediator release, the reduction of mast cell, basophil, and eosinophil accumulation on the nasal mucosal surface, and the inhibition of prostaglandin and leukotriene generation. Intranasal corticosteroid therapy has been shown to inhibit both the early and late inflammatory responses after allergen challenge.

Corticosteroids are highly effective in treating both seasonal and perennial allergic rhinitis. The control of nasal symptoms is achieved in at least 75% of patients, with comparable results in children and adults. Corticosteroid administration lessens all symptoms of allergic rhinitis including itching, sneezing, rhinorrhea, and blockage, and in some instances relieves eye symptoms. Corticosteroids have also been found to be useful in other rhinitis conditions, including nonallergic rhinitis with eosinophilia, nasal polyposis, rhinitis medicamentosa, and, in some patients, vasomotor rhinitis.

The potency of corticosteroids exceeds that of antihistamines, decongestants, and cromolyn sodium. This class of medication works best on a continual versus an as-needed basis. The relief of symptoms usually begins within two to three days of initiating therapy; a maximum response may require two to three weeks for some patients. Initially reserved as a second-line agent, the role of intranasally given steroids is changing. In the past, antihistamines, with or without decongestants, have been recommended as first-line therapy, but corticosteroids are increasingly being used as an initial drug for chronic allergic rhinitis. For those patients with substantial rhinitis or with persistent eye complaints, oral antihistamines or decongestants are usually necessary to complement intranasal steroid therapy. Therapy should be continued throughout the expected season for hay fever and may be required on a long-term basis for perennial allergic rhinitis.

Three synthetic corticosteroids, beclomethasone dipropionate, flunisolide, and triamcinolone, are available for the topical treatment of rhinitis. The anti-inflammatory activities of these preparations are in the range of 1,000 to 5,000 times greater than that of hydrocortisone. Most comparison studies of these different agents have yielded results suggesting that all appear to be similarly efficacious. Although initial recommendations with beclomethasone and flunisolide were that these drugs be administered four times a day, there is no evidence that anything is gained by dosage regimens more complicated than twice a day. For beclomethasone and flunisolide, the recommended adult starting dose is one to two sprays in each nostril twice a day. Triamcinolone, the newest available intranasal corticosteroid, has been marketed as a once-a-day medication, and, indeed, studies using one to two sprays in each nostril once a day have shown it to be efficacious. In many patients, once-a-day dosing is often possible with beclomethasone and flunisolide, particularly after the patient has obtained control of rhinitis on the higher initial twice-a-day starting dose. The dose of the nasal steroid should be adjusted based on the clinical response, with the goal to use the lowest dose that provides efficacy.

The major difference in the various available corticosteroid preparations has more to do with the vehicle and delivery system than with their potency. These differences primarily predict the variability of acceptance of the different preparations. Flunisolide is most commonly associated with burning and stinging, related to the propy-

lene glycol in the vehicle and its associated low pH rather than from the drug itself. A new formulation with less propylene glycol is in development and may eliminate this problem. Beclomethasone is available as a freon-propelled metered-dose unit (Beconase, Vancenase) and an aqueous formulation (Beconase AQ, Vancenase AQ). The pump sprays that use the aqueous formulation appear to provide better distribution of the drug compared with the aerosol, although few studies have directly compared the mode of delivery, and clearly both preparations relieve symptoms relative to placebo. Certain patients prefer the freon-propelled aerosol delivery system because there is less medication run-off than with an aqueous formulation. Triamcinolone (Nasacort) is available as a freon-propelled aerosol with a slightly different nasal adaptor delivery device from the aerosol version of beclomethasone.

Local nasal irritation is the major side effect of intranasal corticosteroids. This problem is usually not important and rarely prevents a patient from complying with the regimen. About 1% to 2% of patients will have a bloody discharge, and septal perforations have been rarely detected. Biopsies of the nasal mucosa of patients who have received beclomethasone continuously for at least five years have shown no signs of atrophy or metaplasia. Systemic side effects have not been detected in clinical trials using the three synthetic steroid preparations, although if carefully looked for, systemic absorption and even some mild effects on the hypothalamic pituitary-adrenal axis can be measured. Recent data from studies of corticosteroid therapy for asthma suggest that long-term inhaled corticosteroid therapy may be associated with adrenal atrophy, decreased bone formation, impaired growth, and cataract formation, but all of these findings are the subject of dispute. The patient at greatest risk for complications is anyone, particularly a child, being treated with inhaled steroids for both asthma and rhinitis and therefore receiving an overall considerable dose of inhaled steroid, possibly leading to sizable systemic absorption and resulting steroid side effects. Although the risks of systemic effects accruing from the long-term use of intermediate or high doses of corticosteroids need further study, it can be argued that, given the available information, corticosteroids at standard doses are a valuable tool in the management of several types of rhinitis with an acceptable risk-to-benefit ratio.

New corticosteroid preparations on the horizon include budesonide and fluticasone propionate. Both have a high ratio of topical to systemic activity over a wide dose range and appear at least as effective as beclomethasone and flunisolide in the treatment of allergic rhinitis, offering a therapeutic alternative to currently available agents. Because chlorofluorohydrocarbons will be banned in the near future, powder-type corticosteroids are being studied and may represent a new delivery system.

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Latex Allergy

LATEX IS THE MILKY SAP obtained from numerous plants, predominantly the rubber tree (*Hevea brasiliensis*), and is used in the manufacture of natural rubber products for both medical and nonmedical uses. Products containing natural rubber include surgical, examination, and cleaning gloves, condoms, balloons, catheters, rubber bands, and elastic adhesives used in dentistry. Synthetic rubber products (derived from petroleum and alcohol) are increasingly being used and do not contain latex.

Two types of allergic reactions to latex-containing products have been described. Contact dermatitis (T cell-mediated, type IV hypersensitivity) from exposure to rubber products, especially gloves, has been recognized for decades. This immunologic reaction is not against latex antigens but to sensitizing chemicals added during the manufacturing process, such as mercaptobenzothiazole or tetramethylthiuram. This reaction can be determined by patch testing for the relevant additives.

Since 1979, there have been an increasing number of reports in the medical literature of immunoglobulin (Ig) E-mediated allergic reactions (immediate, type I hypersensitivity) to latex-containing products. Clinical reactions have included local contact urticaria, systemic urticaria, rhinoconjunctivitis, asthma, or anaphylaxis. Most dramatic have been reports of intraoperative anaphylaxis from exposure to surgical gloves and other latex-containing products and anaphylactic reactions from rubber-tipped enema catheters. Exposure to latex allergen has usually been at mucosal surfaces but can also be from other cutaneous, percutaneous, and parenteral transmission. Aerosol transmission has also been described and is postulated to be caused by latex allergen adhering to cornstarch released into the air with the manipulation of rubber gloves.

The prevalence of IgE-mediated latex allergy in the general population is not known but appears to be low, less than 1%. Allergic reactions to latex are more often seen in atopic persons, and those with prolonged or repeated exposure to latex products are at increased risk. Between 18% and 28% of children with myelodysplasia have a history of acute allergic reactions to rubber products. A serologic survey of similar patients revealed 34% to have rubber-specific IgE by radioallergosorbent test (RAST). Children with congenital urologic abnormalities also have an increased risk of IgE-mediated latex allergy; in both of these groups, the allergy presumably is from frequent urinary bladder or bowel catheterization and multiple surgical procedures. Those with occupational exposure to rubber products, such as health care professionals or rubber-industry workers, also are at an increased risk related to the amount of exposure. In a study of